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DRAFT
SAMPLING AND ANALYSIS PLAN
FOR THE REMEDIATION OF TRENCH T-2; OPERABLE UNIT 2
JULY 11, 1995

REV. 0

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ACRONYMS

BSL	Background screening level
CLP	Contract Laboratory Program
COC	Contaminants-of-Concern
DCE	Dichloroethene
DMP	Data Management Plan
DQO	Data Quality Objective
EQS	Environmental Quality Support
ER	Environmental Restoration aka ERM, Environmental Restoration Management
GC	Gas Chromatograph
GRRASP	General Radiochemistry and Routine Analytical Service Protocol
IHSS	Individual Hazardous Substance Site
OU	Operable unit
PAM	Proposed Action Memorandum
PCE	Tetrachloroethylene
PID	Photoionization Detector
PRG	*Preliminary* Remediation Goal
QAA	Quality Assurance Addendum
QAPjP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RFETS	Rocky Flats Environmental Technology Site
RFEDS	Rocky Flats Environmental Database System
SAP	Sampling and Analysis Plan
SQL	Sample quantitation limit
SVOCs	Semi-volatile organic compounds
TCE	Trichloroethylene
TCL-VOA	Target Compound List-Volatile Organic Analysis
USEPA	United States Environmental Protection Agency
VOCs	Volatile organic compounds
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCE	1,2-Dichloroethene
1,1,1-TCA	1,1,1-Trichloroethane

DRAFT
PROPOSED ACTION MEMORANDUM
FOR THE REMEDIATION OF TRENCH T-2; OPERABLE UNIT 2

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) and attachments describes the specific sampling and analysis requirements to document the removal action described in the Proposed Action Memorandum (PAM) for the Remediation of Trench T-2, Operable Unit (OU) 2, Rocky Flats Environmental Technology Site (RFETS). The SAP includes project specific data quality objectives (DQOs).

Objectives of the sampling and analysis are to:

- Document concentrations of chemicals of concern in residual undisturbed soils; and
- Characterize contaminated soils to be treated by thermal desorption.

The objective of the SAP is to describe the specific data needs, sampling and analysis requirements, data handling procedures, and associated Quality Assurance/ Quality Control (QA/QC) requirements for the completion of soil sampling conducted as part of the Trench T-2 removal action.

The SAP contains four sections: Section 1 provides the introduction; Section 2 describes the Trench T-2 removal action and the results of previous sampling; Section 3 develops data quality objectives for the sampling, and describes the number and locations of samples; and Section 4 describes the sample collection and handling procedures.

Appendix A is the Data Management Plan and Appendix B is the QA/QC Plan for this sampling. This SAP will be conducted under the quality umbrella of the Environmental Restoration (ER) sitewide Quality Assurance Project Plan (QAPjP)

2.0 TRENCH T-2 REMOVAL ACTION PROJECT DESCRIPTION

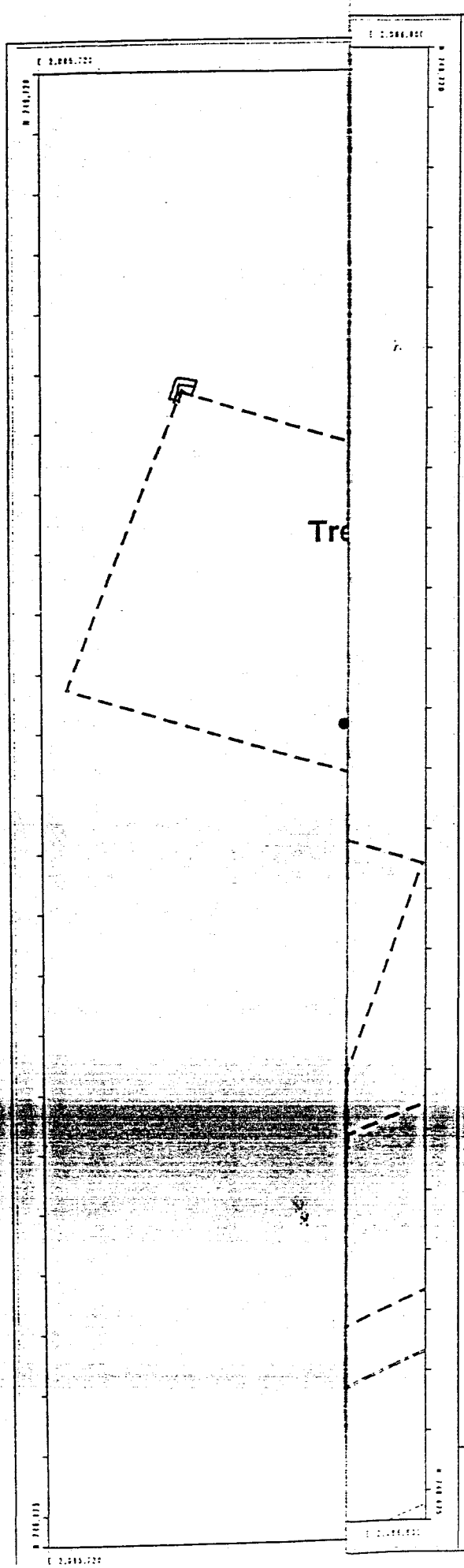
Operable Unit 2, Trench T-2, Individual Hazardous Substance Site (IHSS) 109 was used from approximately 1966 through 1971 to dispose of nonradioactive liquid chemicals The organic chemicals, disposed in small quantities, included tetrachloroethylene (PCE), trichloroethylene (TCE), and possibly carbon tetrachloride. Other materials that were disposed in the drench included paint thinner and small quantities of construction-related materials.

Organic compounds from miscellaneous small projects, e.g. bench scale testing and special projects were believed to be collected for disposal at Trench T-2. Normal process waste solvents from production buildings are not believed to have been poured in Trench T-2.

The trench is believed to be approximately 25 feet by 12 feet by 10 feet deep. The dimensions are based on a field investigation and sample collection performed in the spring of 1995 and historical accounts by a health physicist familiar with the trench location. Recently, the perimeter of the trench was land surveyed (Figure 2.0-1). The trench lies within an area where surficial soils are contaminated with Americium-241 (Am-241) and Plutonium-239 (Pu-239). These contaminants were deposited by wind transport from the 903 drum storage area (IHSS 112).

Based on the historical information about the use of Trench T-2, no radiological wastes were disposed of in the trench. The radiological contaminants identified in soils during the remedial investigation were collected by compositing samples from 0 to 9 feet in depth and may have resulted from the surficial contamination in the area due to the proximity to IHSS 155, the 903 Lip Area. The levels of radiological contamination in the Trench T-2 soil is expected to be well below the PRGs. Return of this processed soil to the trench excavation is ~~not inconsistent~~ consistent with the eventual long-term action for OU 2.

Figure 2.0-1
Operable Unit 2
IHSS 109
Trench T-2



Sampling Types

- Borehole
- Groundwater Well
- Geoprobe Site

Standard Map Features

- IHSS Boundary
- Trench Boundary
- Fences
- Paved roads
- Dirt roads

DATA SOURCE:
Buildings, roads, and fences provided by
Facilities Engr.,
EG&G Rocky Flats, Inc. - 1991.
Hydrology provided by
USGS - (date unknown)

0 30 60ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

MAP ID: ***Draft*** July 03, 1995

/home/510065/ou1/f-2.arm

2.1 Hydrogeologic Conditions

Trench T-2 is located downslope of the erosional edge or extent of the Rocky Flats Alluvium. Colluvium that is principally derived from the Rocky Flats Alluvium is present at the ground surface and extends approximately six feet beneath the base of the trench. These surficial deposits are underlain by the Arapahoe Formation consisting of weathered claystones and tight sandstones. Groundwater occurs seasonally in the surficial materials directly above the bedrock claystones and tight sandstones.

2.2 Proposed Action

The proposed action entails removing the existing Volatile Organic Compound (VOC)-contaminated material removed from the Trench T-2. The excavation will remove the contaminated material existing in the trench and the additional soil existing two feet beyond the side and lower boundaries of the trench. (However, if bedrock is encountered before the additional two-foot buffer is excavated, the excavation will terminate at bedrock.) The efforts to overexcavate this trench are to remove potential contaminated source material beyond the trench boundaries.

The remediation of Trench T-2 will entail the excavation of approximately 200 cubic yards of material. As a first measure, the surficial soils (approximately the top six inches) of the trench will be laid back away from the planned excavation area of the trench. This will prevent the Am-241 contaminated lip area soils from being commingled with the Trench T-2 soils. A 245 Backhoe, or comparable piece of equipment, will be used to excavate the soil from the trench. The equipment will be selected with preference towards excavators that minimize worker exposure to the trench and minimize shoring requirements. Samples will be collected from the trench walls and floor and analyzed for the contaminants of concern.

The contaminated soil will be containerized in roll-off boxes and staged for on-site treatment by thermal desorption.

If dewatering of the trench is necessary, a field sump will be created in the trench and pumped out with a portable submersible pump into a temporary storage tank. Water in the tank will be sampled prior to treatment. The water will be treated in Building 891, the OU 2 Field Treatability Unit, the planned Sitewide Consolidated Water Treatment Facility, or in Building 374, then sampled and released in accordance with respective discharge criteria. Alternatively, the water may be taken offsite for treatment and disposal if appropriate.

The VOC-contaminated soils, removed from the trench, will be processed using a mobile thermal desorption unit onsite. Thermal desorption is an ex-situ process in which a contaminated soil or sludge is heated to a temperature sufficient to volatilize the organic compounds of concern. Prior to being fed into the thermal desorption unit, oversize material, such as large cobbles and debris, will be removed from the soil feedstock and the feedstock will be sampled and analyzed for volatile organic and radionuclide (Pu, Am) content. Processed soils will then be analyzed for volatile organics and radionuclides (Pu, Am) and returned to the trench site.

2.3 *Historical Data Summary*

Soil samples were collected from a series of boreholes (09291, BH2587, 21891, 09491) located downgradient of Trench T-2 in 1992. The data is presented in the Remedial Investigation Report, May 1995, and is summarized as follows.

VOCs detected in subsurface samples collected at Trench T-2 included PCE (maximum concentration of 10,000 ug/kg in a sample collected from borehole BH2587 at a depth of 14.5 to 15.7 feet); TCE (maximum concentration of 16,000 ug/kg in a sample collected from borehole BH2587 at a depth of 18.5 to 19.3 feet); toluene (maximum concentration of 2,000 ug/kg in a sample collected from borehole 21891 at a depth of 43.8 to 44.1 feet); and total xylenes (maximum concentration of 3,300 ug/kg in a sample collected from borehole BH2587 at a depth of 14.5 to 15.7 feet). Several additional VOCs were also detected but at concentrations less than 800 ug/kg. Detected VOC compounds are summarized in Table 2.3-1. The depth to the seasonal high groundwater level is approximately 3.6 feet. Therefore, most of the VOC maximum concentrations detected were found in samples collected below the water table.

All of the semi-volatile organic compounds (SVOCs) detected were at concentrations below their respective sample

quantitation limits (SQLs).

Six metals (arsenic, barium, cadmium, cobalt, lead, and zinc) were detected above the background screening levels (BSLs) in subsurface samples collected. However, detections were typically at or only slightly above the respective BSLs (with the exception of cobalt and barium). One sample analyzed had a cobalt concentration of 204 mg/kg that exceed the BSL of 29.2 ug/kg. Barium concentrations exceeded the BSL of 289 ug/kg in 2 samples; the maximum concentration was 1899 ug/kg. Based on process knowledge, no metals were added to the trench. Metals in geologic media generally gave a log-normal distribution. The reported concentrations of barium and cobalt are within the expected range of background variability.

Several radionuclides were detected above the BSLs. However, only Pu-239/240 (a subsurface soil COC) exceeded the BSLs (0.066 pCi/g). The maximum detected activity of Pu-239/240 was 3.2 pCi/g, associated with a sample collected at a depth of 0 to 9 feet. One sample analyzed had a detected Am-241 activity (0.22 pCi/g) that exceeded the BSL (0.022 pCi/g) by one order of magnitude.

During the spring of 1995, soil borings were collected in the actual trench by using the geoprobe. The preliminary volatile organic data shows high concentrations of TCE, PCE, toluene, and xylene. The concentrations of the volatile organic compounds are identified in Table 2.3-2. The analytical data for the metal and radionuclide samples collected from the trench are still unavailable. During the sampling event, the investigation crew noticed a black stained soil collected at a depth of 4 feet in the borehole 13395.

Table 2.3-1
Trench T-2 Data Collected March 1995*
Maximum Concentrations for Analytes

Analyte	Concentration (ppb)	Location	Depth (ft)
1,1,1-TCA	430,000	13395	3-5
TCE	20,000	13295	3-5
PCE	470,000	13395	3-5
Toluene	310,000	13395	3-5
Ethylbenzene	92,000	13395	3-5
Xylene	590,000	13395	3-5
1,2-DCE	90,000 J	13395	3-5
1,1-DCE	94	13395	3-5
1,1-DCA	340	13395	3-5
2-Butanone	110 J	13395	3-5
1,2-Dichloropropane	330 J	13295	3-5
4-Methyl-2-pentanone	5,300	13295	3-5
1,1,2-TCA	10 J	13395	8-10
1,1-DCE	94	13395	8-10
1,1-DCA	340	13395	8-10
1,1,1-TCA	260	13395	8-10
TCE	100	13395	8-10
Toluene	220	13395	8-10
Xylene	40	13395	8-10

*Data is unvalidated.

The downgradient monitoring wells, 07391 and 0271, show similar contamination in the groundwater as to what is present in Trench T-2. Table 2.3-3 shows a data summary of the detectable organic contamination in the groundwater.

Table 2.3-2
Groundwater Well Data Downgradient of Trench T-2

Analyte	Concentration (ug/l)	Sample Date	MCL
Groundwater Monitoring Well 07391			
Chloroform	1200	12-5-94	100
Chloroform	1100	3-14-95	100
PCE	600	12-5-94	5
PCE	780	3-14-95	5
TCE	65000	12-5-94	5
TCE	67000	3-14-95	5
Groundwater Monitoring Well 0271 (abandoned)			
1,1,1-TCA	12	2-25-92	
1,1-DCA	17	2-25-92	
1,2-DCE	180	2-25-92	
Chloroform	75	2-25-92	100
PCE	57	2-25-92	5
TCE	4800 J	2-25-92	5

3.0 SAMPLING APPROACH AND REQUIREMENTS

The objectives of the sampling and analysis are: to document concentrations of chemicals of concern in residual undisturbed soils; to determine the concentration of volatile organics in the soils before and after treatment by thermal desorption, to document the concentrations of Pu and Am in soil returned to the trench and to characterize any water removed from the trench. Table 3.1 shows the sampling scheme documenting the undisturbed margins of the excavation. Data Quality objectives are developed in Section 5.3.1 of Appendix B, QA/QC Plan.
Soil samples shall be collected for Target Compound List-Volatile Organic Analysis (TCL-VOA) and the radionuclides plutonium 239/240 and americium 241. A rad screen, per procedure 5-21000-OPS-FO.18, will be collected for each individual VOA and radionuclide sample.

The soil sampling approach will be consistent with the CDPHE approved sample collection for USTs which involve excavations of similar size. Ten samples shall be collected upon completion of the trench excavation. Four samples shall be collected from locations about equally spaced along the bottom of the excavation. The approximate locations are shown in Figure 3.0-1. One sample shall be collected at locations approximately mid-depth and mid-length along each side of the excavation. Also, Quality Control (QC) samples shall be collected including one duplicate soil sample and one rinsate (liquid) sample. One trip blank will be shipped with samples for volatile analysis. Table 3.1 summarizes the analytical requirements for the unexcavated margin.

Table 3.1 Excavation Boundary Analysis

Soils Analysis				
Analysis/Method	Trench Samples	QC Samples	Total Samples	Container/Preservatives/Holding Time
Volatile Organics/TCL-VOA	8	1 duplicate	9	4 oz. glass w/ Teflon liner/4oC/ 7 days
Radionuclides/ Am241 Pu239/240 Alpha Spec.	8	1 duplicate	9	500 ml glass jars/NA/61 days
Water Analysis	Tank Sample			
Volatile Organics/TCL-VOA	1-3 (as necessary)	1 rinsate	2-5	2-40 ml VOA vials/4oC/7 days
		1 trip blank per cooler	1-3 (as necessary)	2-40 ml VOA vials/4oC/7 days • containers filled by laboratory
Radionuclides/ Am241 Pu239/240 Alpha Spec.	1 rinsate	1	2	1 gal poly/HNO_3/61 days

Grab samples will be collected from excavated soils prior to processing for radionuclide and organic analysis. These analyses will document the radionuclide and organic content of the soil being processed, and also document the radionuclide content of soils being placed in the trench following treatment, as the treatment process will not affect radionuclide content. One grab sample will be collected per batch, as described in Table 3.2. Samples will be collected at the rate of one per batch after treatment to document treatment efficiency. Process samples will be analyzed by an on-site gas chromatograph. One in ten samples will be collected in triplicate for analysis by the onsite GC, duplicate analysis by the onsite GC, and analysis by an offsite laboratory.

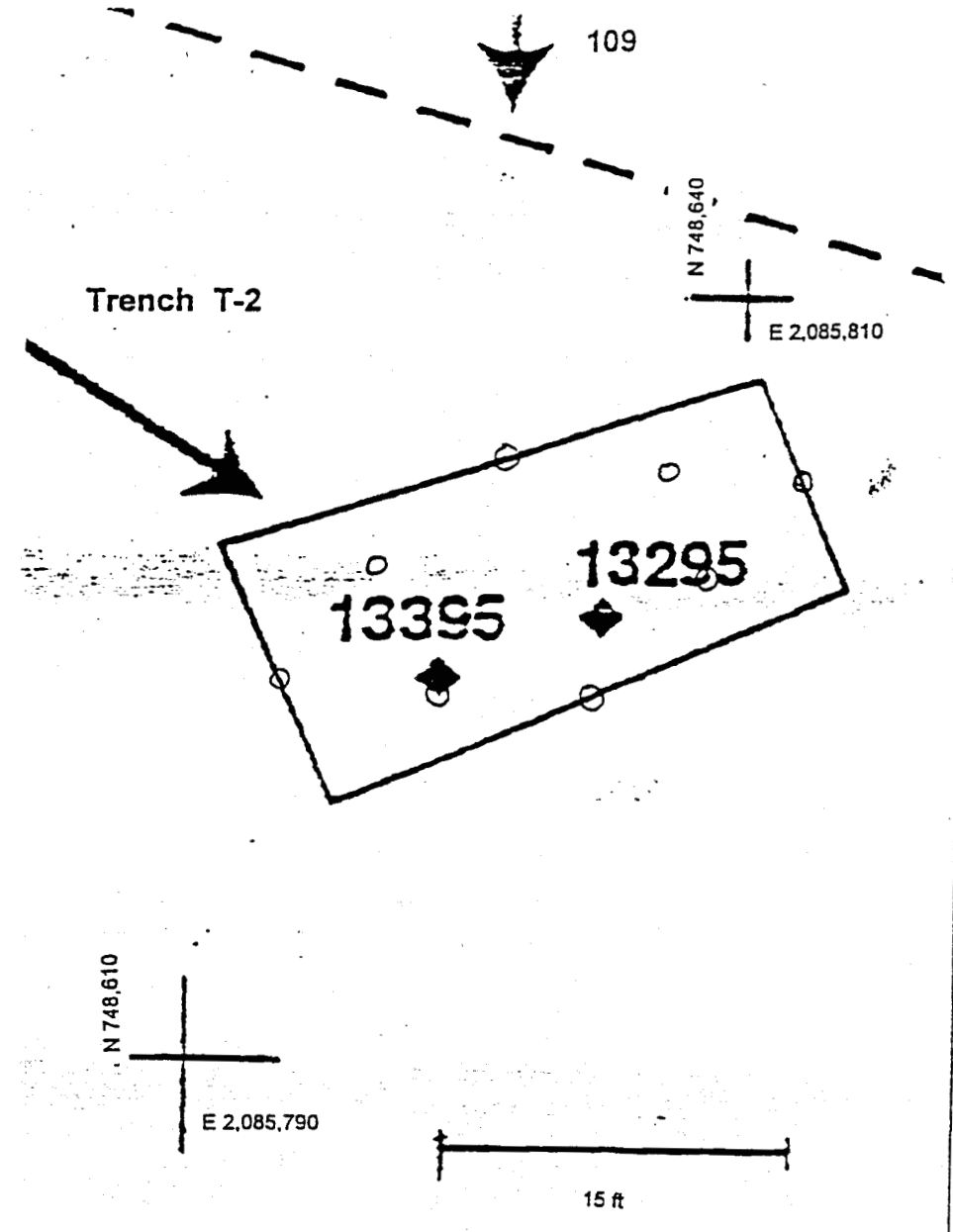


Figure 3.0-1

Operable Unit 2

IHSS 109

Trench T-2

Sample Locations

Sampling Types

- Borehole
- Groundwater Well
- Geoprobe Site
- Grab Sample

Standard Map Features

- IHSS Boundary
- Trench Boundary
- Fences
- Paved roads
- Dirt roads

DATA SOURCE:

Buildings, roads, and fences provided by Facilities Engr., EG&G Rocky Flats, Inc. - 1991.

Hydrology provided by USGS - (date unknown)

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

MAP ID: "Draft"

Jan 03, 1995

Table 3.2 Process Soil Analysis

Analyte/ Method	Pre-process Samples	QC Samples	Total Samples	Containers/preservative/holding time
Volatiles/ Onsite GC/EPA TCL-VOA	1 per batch, 10 batches	1 duplicate per 10 batches	11	4 oz glass w/ Teflon liner/4°C/7 days
Volatiles/ EPA (offsite lab) TCL-VOA		1 per 10 batches	N/A	4 oz glass w/ Teflon liner/4°C/7 days
Pu239/240 Am241 Alpha Spec.	1 per batch	1 per 10 batches	11	500 ml glass jars/NA/61 days
	Post-process samples			
Volatiles/ Onsite GC/EPA TCL-VOA	1 per batch 10 batches	1 duplicate per 10 batches	11	4 oz glass w/ Teflon liner/4°C/7 days
Volatiles/ EPA (offsite lab) TCL-VOA		1 per 10 batches	N/A	4 oz glass w/ Teflon liner/4°C/7 days

All laboratory work will be done according to the U.S. Environmental Protection Agency's (USEPA's) Contract Lab Program (CLP) standards. The CLP-type analysis is outlined in the July 2, 1991 revision of the document entitled "EG&G Rocky Flats, General Radiochemistry and Routine Analytical Service Protocol (GRRASP)."

4.0 SAMPLE COLLECTION AND HANDLING PROCEDURES

The excavated trench shall be sampled in accordance with GT.7, "Logging and Sampling of Test Pits, Trenches, and Construction Excavations." However, because of the hazards associated with entry into steep-sided, unsupported excavations, field personnel shall not enter the excavation. Each sample shall be collected from the excavated trench by means of a backhoe. The excavated soil contained in the backhoe bucket shall be elevated from inside the trench to the ground surface. At the ground surface, sufficient quantities of soil shall be transferred from the bucket to adequately fill the sample containers using a stainless steel spatula. Soils for volatile analysis will be collected directly into the sampling jar to minimize loss of VOCs. Loss of volatile samples will be collected from soils that are not directly adjacent to the backhoe blade.

Sample labeling, handling, and shipping shall be performed in accordance with FO.13, "Containerization, Preserving, Handling and Shipping of Soil and Water Samples."

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APPENDIX A
DATA MANAGEMENT PLAN
FOR THE REMEDIATION OF TRENCH T-2; OPERABLE UNIT 2

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1.0 INTRODUCTION

The purpose of this Data Management Plan (DMP) is to support the Sampling and Analysis Plan for the Remediation of Trench T-2 and to specify the mechanisms and procedures for the transfer of data from its collection to storage. The DMP lists elements defining personnel responsibilities, sample documentation, sample tracking, data entry, and data proofing. The remediation of Trench T-2 will collect and analyze data from:

Onsite and laboratory analysis of soil samples for volatile organics, including QC samples.

Laboratory analysis of water to determine treatment options (if necessary).

Laboratory analysis of soil samples for radionuclides.

Data will be managed according to the customary procedures including:

FO.14, "Field Data Management;"

FO.02, "Transmittal of Field QA Records."

These procedures will ensure that data is collected, entered, and stored in a secure, controlled, and retrievable environment. After entry into the interim database, Datacap, the data will be uploaded to the Rocky Flats Environmental Database System (RFEDS) database.

2.0 PERSONNEL RESPONSIBILITIES

The Project Manager is be responsible for ensuring that all data are collected, verified, transmitted and stored in a manner consistent with this DMP and in compliance with relevant Operating Procedures. The Project Manager will obtain from the RFEDS User System Manager sample numbers and location codes. The User System Manager will verify any transmitted record for accuracy and completeness and ensure the data is preserved, retrievable, and traceable.

The sample crew personnel will be responsible for field data collection. Their data management tasks will include completing all appropriate data management forms and completing the Chain-Of-Custody form. The sample crew delivers forms and Chain-of-Custodies to the Data Manager.

The Sample Manager/Data Manager is responsible for verifying that the Chain-of-Custodies are complete and accurate before the samples are shipped to the laboratory. The sample manager obtains the preliminary Radiological screen, from the onsite lab, for release of the samples offsite. The data managers duties include: data entry into Datacap; and transmitting field information, sample collection data and Chain-of-Custody tracking data to RFEDS.

3.0 DOCUMENTATION

Field instrument data and sample collection forms should include the following information for each data or sample point:

- field sample identification;
- date and time sampling/measurement;

- sample location;
- sample description;
- sample depth (if appropriate);
- parameters or analyses being reported;
- associated QA/AC samples; and
- field measurements made by field instruments.

4.0 DATA ENTRY AND DATA PROOFING

Data collected manually will consist of field measurements from Ludlum or equivalent alpha and gamma monitoring instruments. These field measurements shall be recorded on the appropriate form, (Figure 4-1). Soil sample information shall be recorded on form FO.14G, "Pit and Trench Form." The data shall be entered into Datacap. These forms will be reviewed by the project manager prior to data entry. A hardcopy of the manually entered data will be initialed and dated by the project manager and the data manager.

Data will be checked for transcription errors, accuracy, and to ensure that all samples that were intended to be collected were collected, shipped and entered into datacap. Changes or corrections may be required in the data stored in Datacap. All changes must be accompanied by a data correction/change form (figure 4-2). The form will detail the changes to be made and document that the changes were completed. Corrections to the database will be reviewed by the Data manager or designee for potential entry errors.

5.0 FINAL REVIEW

These procedures are designed to ensure the final data submitted to RFEDS is complete and correct.

- A hard copy of the data organized by location will be verified by the Data Manager or designee.
- All corrections to the hard copy will be made in red ink.
- Using the data entry sheets and sample collection sheets, check that data identifications are correctly listed on the hardcopy, and the number of samples collected and shipped is correct.
- Check that all the parameters requested for each analysis are reported on the hardcopy and that units reported on the hardcopy are correct.
- Check values for all manually collected parameters reported from the database against the field collection forms.
- The data will then be reviewed by a scientist familiar with the project objectives and data collection activity to disposition data containing gross errors.
- Check the corrected copy of the database to determine that corrections have been implemented.

Figure 4-1

FIDLER OR LUDLEM MEASUREMENT FOR

1. Monitoring Location: _____ Date: _____

2. Equipment Information and Background Measurements

Manufacturer and Model No.	Serial Number	Calibration Date	Background Reading	Units - Counts Per Minute

3. FIDLER or Ludlem Measurements

Sampler Initials	Time (military)	Reading (CPM)	Depth (inches)

Checked By: _____
Print Name Signature

Figure 4-2

DATA CORRECTION/CHANGE FORM

The following changes and/or corrections to the database are required (check all that apply):

_____ Data qualifiers have been assigned to the attached sample data

_____ The following sample analyses have been changed:

_____ Other changes or corrections (describe below):

Changes Requested By: _____
(Print Name) (Signature) (Date)

Changes Made By: _____
(Print Name) (Signature) (Date)

Changes Checked By: _____
(Print Name) (Signature) (Date)

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APPENDIX B

QA/QC PLAN

FOR THE REMEDIATION OF TRENCH T-2; OPERABLE UNIT 2

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1.0 INTRODUCTION

This Appendix consists of the Quality Assurance Addendum (QAA) for the Remediation of Trench T-2. The QAA identifies the QA requirements and measures to implement the requirements that apply to the remediation action. This document is a supplement to the RFETS QAPjP and it defines the site specific QA controls applicable to the activities described in this SAP.

2.0 SCOPE

The actions within this SAP controlled by this QAA include:

- Definition of DQOs
- Collection of field screening data
- Sample collection
- Sample handling and shipping
- Excavation
- Data Analysis

3.0 BASIS FOR TECHNICAL ACTIVITY

The work outlined in the SAP for the Remediation of Trench T-2 is to identify the specific analytical needs, sampling requirements, data handling requirements, and associated QA/QC requirements for the completion of the remediation action. This includes the completion of three objectives, which are; 1) to document concentrations of chemicals of concern in residual undisturbed soils, 2) characterize water (if any) produced from trench dewatering, and 3) characterize volatile organic concentration in soil pre and post treatment.

4.0 BASIS OF QUALITY ASSURANCE REQUIREMENTS

The QAPjP was prepared to identify the QA requirements and methods applicable to the RFETS Environmental Restoration (ER) Program activities, as identified in the Attachment 2 of the IAG Statement of Work. Section IV.A of the IAG specifies the minimum quality elements that the QAPjP must include, and references EPA QAMS/005/80, *Interim Guidelines and Specifications for preparing Quality Assurance Project Plans*, for guidance in preparing the QAPjP.

5.0 QUALITY REQUIREMENTS

The following outlines the quality requirements for the Remediation of Trench T-2 SAP.

5.1 Organization and Responsibilities

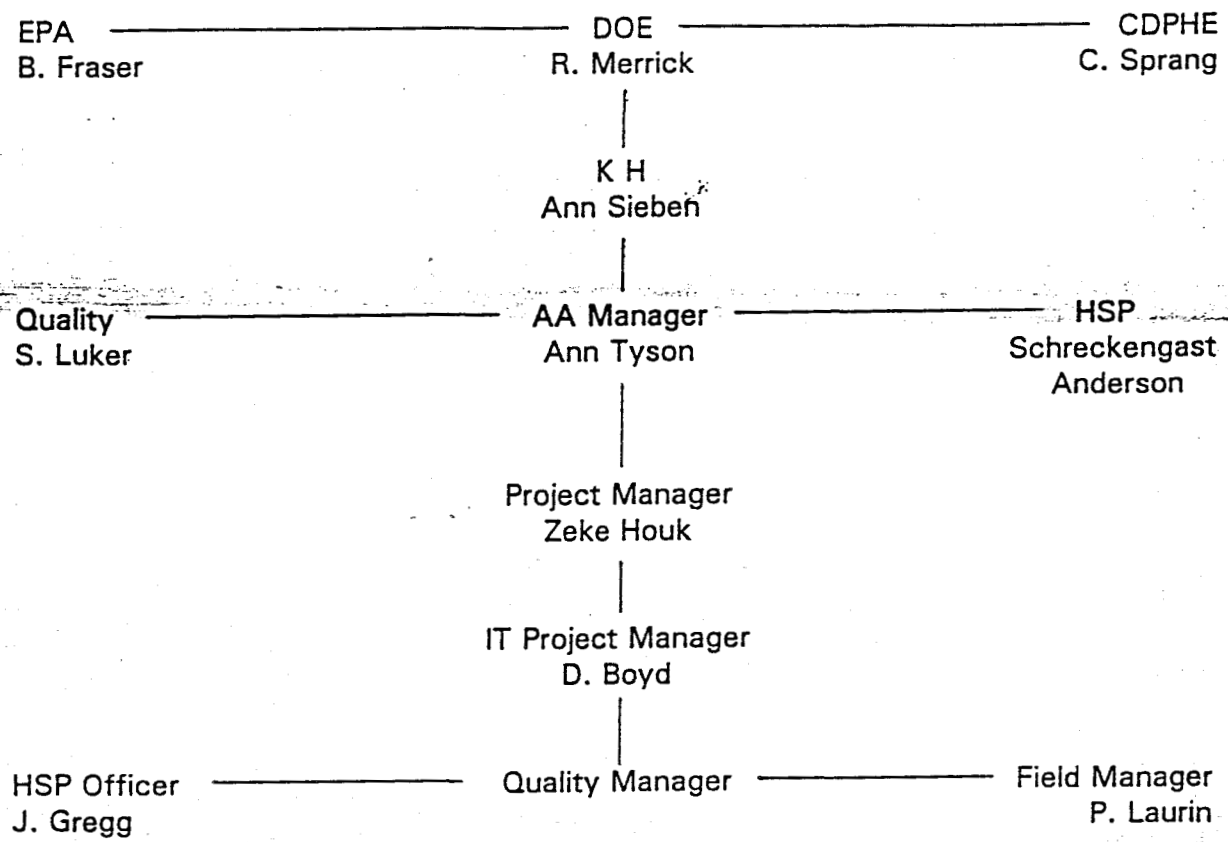
The Accelerated Cleanup Team in the ER organization is responsible for the overall coordination of the remediation of Trench T-2. Other organizations such as the Analytical Services Organization and the subcontracted external laboratory will be involved with this work. Responsibilities of other organizations will be assigned by the Accelerated Cleanup Team.

An organization chart for this project is shown in Figure 5-1. The organization has been structured to maintain a high level of quality in all areas of work to be performed. Conformance to established requirements shall be verified by individuals not directly responsible for performing the work. The Accelerated Cleanup Team is responsible for management and coordination of resources dedicated to the project.

5.2 Quality Assurance Program

The ER Environmental Quality Support (EQS) Department is responsible for preparing this QAA and providing internal quality implementation support (including inspections and surveillance of system acceptance and performance) to assure that the quality requirements of this QAA and the QAPjP are being implemented. This QAA addresses additional and project specific QA controls that may not have been addressed in the QAPjP.

Figure 5-1


EPA
B. Fraser
DOE
R. Merrick
CDPHE
C. Sprang
K H
Ann Sieben
Quality
S. Luker
AA Manager
Ann Tyson
HSP
Schreckengast
Anderson
Project Manager
Zeke Houk
IT Project Manager
D. Boyd
HSP Officer
J. Gregg
Quality Manager
Field Manager
P. Laurin

5.2.1 Training

The minimum personnel qualification and training requirements that are applicable to staff for ER Program activities are addressed in Section 2.0 of the QAPjP. Qualification records shall be provided for all personnel to document fitness to perform their assigned tasks. The Project Manager shall identify any specialized training requirements that are applicable to individual project personnel. Field personnel shall have the following training:

OSHA 40-hour HAZWOPER
OSHA On the Job Training Checklist
RCRA Computer Based Training
RCRA Supervisors Checklist
Applicable Operating Procedures
QAPjP requirements

5.2.2 Quality Assurance Reports

A QA summary report will be prepared at the conclusion of the Trench T-2 remediation activities by the QA Program Manager. This report will include a summary of inspections, lab assessments, surveillances and data verification/validation results.

5.3 Control of Scientific Investigations

5.3.1 Data Quality Objectives

The Data Quality Objectives for the sampling and analysis are presented in Table 5.1.

Statement of the Problem: The purpose of the SAP is to identify the specific analytical needs, sampling requirements, sampling disposition, data handling requirements, DQOs, a brief site summary, and QA/QC requirements, characterize undisturbed soils following source removal, to characterize the Trench T-2 contaminant source material before and after treatment by thermal desorption and to characterize water (if any) removed during source excavation. Details regarding the accelerated response action are presented in the PAM and in Section 2.3 of the SAP.

Decisions: A CERCLA removal action has been identified as the approach to conducting an accelerated response action to reduce potential risks to the public. The PAM presents the proposed process and authorization for the accelerated response action. The trench will be overexcavated a distance of two feet in all directions or until bedrock is encountered to ensure removal of the source contaminants. Data collected on residual undisturbed soils may be utilized in future remediation decisions regarding residual (non-source) areas of OU 2. Data collected from water produced during trench de-watering will be utilized to determine whether the water must be treated prior to discharge, and where to treat it. Data collected for pre and post treatment characterization of soils will be used to 1) document process effectiveness (organics) and 2) document the concentrations of Pu and Am being returned to the trench.

Table 5.1

Data Quality Objectives

Data Quality Objective	Assurance Method
Document concentrations of COCs in residual and undisturbed soils.	Eight soil samples to be taken from trench floor and sides at equal spacings. Two QC samples (1 duplicate, 1 rinsate). Testing includes USEPA CLP TCL-VOA, Pu239/240, Am241, and rad screens per the RFETS GRRASP. Sampling procedures per Section 4.0 of the SAP.
Characterize any water produced during de-watering activities to determine if treatment is necessary.	One grab sample of water will be collected from each holding tank and analyzed for volatile organics.
Pre and post-treatment characterization of soils to document treatment process effect.	One grab sample per batch will be collected prior to and following treatment. These samples will be analyzed for volatile organic compounds utilizing an on-site gas chromatograph. One sample per 10 will be collected in triplicate, with analysis by the on-site GC, duplicate analysis with the on-site GC, and off-site analysis by EPA Method GC/MS to confirm the analysis by the on-site GC.
Characterize the radionuclide content of soils to be treated and returned to the trench.	One grab sample per batch will be collected prior to treatment. These samples will be analyzed for Pu239/240 and Am241.

PARCC Parameters:

Precision, accuracy, representativeness, completeness, and comparability (referred to as PARCC parameters) are fundamental parameters used to indicate data quality. The PARCC parameters are summarized in Table 5.2. Determination of the PARCC parameters is described in ERM Procedure 2-G32-ER-ADM, 08.02, *Evaluation of ERM Data for Usability in Final Reports*, (EG&G, 1994).

Table 5.2

PARCC PARAMETER SUMMARY

	ANALYTICAL
PRECISION	Sample Relative Percent Difference <=30%
ACCURACY	Comparison of Lab Control Samples with true values
REPRESENTATIVENESS	Based on use of SOPs and Section 3.0 of the PAM
COMPARABILITY	Based on the use of SOPs, GRRASP, and Section 3.0 of the PAM
COMPLETENESS	Usable data from 90% of the planned field samples and =>50% of lab data validated

5.3.2 Equipment Decontamination

Equipment used for sampling shall be decontaminated between sampling events according to established procedures. All equipment not disposed of shall be decontaminated using appropriate approved procedures at the conclusion of the job.

5.3.3 Quality Assurance/Quality Control

Field sampling QA/QC will be conducted as described in Section 3.0 of the SAP. Tables 5.3 and 5.4 lists the Field and Administrative Standard Operating Procedures and the Laboratory SOPs.

5.3.4 Quality Assurance Monitoring

Field oversight inspections will be conducted at random intervals during sampling and analysis activities by the ERM Environmental Quality Support department.

5.3.5 Data Reduction, Validation, and Reporting

These requirements are addressed in Appendix A of the Sampling and Analysis Plan for the Remediation of Trench T-2.

5.4 Document Control

Documents produced by the Contractor that control the work described in this SAP shall be controlled to ensure that project personnel receive accurate and timely information. Such documents shall be controlled in accordance with section 6.0 of the QAPjP and with *ERM Procedure 3-21000-ADM-5.01, Document Control.*

5.5 Control of Purchased Items and Services

Documents relating to items and services procured under this project shall be prepared, handled, and controlled in accordance with the requirements and methods specified in Section 4.0 of the RFETS-EMS QAPjP and in *ERM Procedure ADM-4.01, Procurement Document Control*, including retention of purchase order receipts, contracts or any other documentation related to the integrity/traceability of the purchased product or service.

Subcontractors that provide services in support of the SAP activities will be selected and evaluated as outlined in Section 7.0 of the RFETS-EMS QAPjP. Any items purchased for use during SAP activities that impact data quality should be inspected upon receipt.

5.6 Identification and Control of Equipment/Items

Soil samples shall be treated in accordance with *EMD Operating Procedure 5-21000-OPS-FO.13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples*. Sampling identifications and COC will be maintained through the application of Section 8.0 of the RFETS-EMS QAPjP and of Procedure 5-21000-OPS-FO.13.

5.7 Control of Sampling and Analysis Processes

Sample collection and analysis is controlled by Sections 3.0 and 4.0 of the SAP. Data input concerns are addressed in Appendix A.

5.8 Inspection and Assessment

Quality related assessments will be performed informally as requested by line management. Independent audits of the project may be conducted by the ER EQS organization in accordance with QA procedures. The work place and working records shall be accessible during normal working hours for verification by the Contractor or their representatives during the performance of this project.

Table 5.3

Field and Administrative Standard Operating Procedures

IDENTIFICATION NUMBER:	PROCEDURE TITLE:
5-21000-OPS-FO.3	General Equipment Decontamination
5-21000-OPS-FO.6	Handling of Personal Protective Equipment
5-21000-OPS-FO.7	Handling of Decontaminated Water and Waste Water
5-21000-OPS-FO.10	Receiving, Labeling, and Handling Environmental Materials Containers
5-21000-OPS-FO.11	Field Communications
5-21000-OPS-FO.12	Decontamination Facility Operations
5-21000-OPS-FO.13	Containerization. Preserving, Handling, and Shipping of Soil and Water Samples
5-21000-OPS-FO.18	Environmental Sample Radioactivity Content Screening
2-G06-ER-ADM-05.10	Use of Controlled Scientific Notebooks
2-G32-ER-ADM-08.02	Evaluation of ERM Data for Usability in Final Reports
4-E42-ER-OPS-GT.08	Surface Soil Sampling
5-21000-OPS-FO.16	Field Radiological Measurements
4-B11-ER-OPS-FO.25	Shipping Limited Quantities of Radioactive Materials in Samples
5-21000-OPS-FO.14	Field Data Management
3-21000-ADM-5.01	Document Control
3-21000-ADM-15.01	Control of Nonconforming Items and Activities
1-50000-ADM-12.01	Control of Measuring and Test Equipment
1-50000-16.16	Corrective Action Program
5-21000-OPS-FO.02	Field Document Control
3-21000-ADM-17.01	Records Management

Table 5.4

Laboratory Standard Operating Procedures

ANALYTICAL SUITE:	CONTROLLING DOCUMENTS:
VOCs	Title 40 of the Codes of Federal Regulation Part 264 Appendix IX. All laboratory analyses will also adhere to protocols specified in Parts A and B of the RFETS General Radiochemistry and Routine Analytical Services Protocol (GRRASP).
Radionuclides	Part B of the GRRASP

5.9 Control of Measuring and Testing Equipment

Measuring and testing equipment (M&TE) used in the screening of samples shall be selected, identified, calibrated, and maintained in accordance with the methods established in *RFETS Administrative Procedure 1-50000-ADM-12.01, Control of Measuring and Test Equipment.* Field equipment documentation will be made on forms identified in Appendix A. Laboratory equipment usage shall be conducted in accordance to the GRRASP requirements.

5.10 Status of Inspections, Tests, and Operations

The status of the sampling and analysis inspections, startup SAP activities, and sustained operations shall be documented according to the requirements of Section 14.0 of the RFETS-EMS QAPjP.

5.11 Control of Nonconformances

The requirements for the identification, control, evaluation, and disposition of nonconforming items, samples, and data will be implemented as specified in Section 15.0 of the RFETS-EMS QAPjP and *ER Procedure 1-50000-ADM-15.01, Control of Nonconforming Items, Samples, and Data.*

5.12 Corrective Action

Conditions adverse to quality identified by the implementing contractor shall be documented and submitted to the Contractor for processing as outlined in the QAPjP.

5.13 Quality Assurance Records

Field QA records will be controlled in accordance with RFETS Procedure 5-21000-OPS-FO.02, Field Document Control. All ER QA records generated shall be submitted to the ER Project File for processing according to *ERM Procedure 3-21000-ADM-17.01, Records Management.*

5.14 Quality Verification

QA surveillances and audits will be periodically conducted by the EQS Department throughout the duration of the project to verify the quality of the project data.